What is claimed is:

1. A thermoplastic polyurethane polymer comprising the reaction product of:

(a) at least one hydroxyl terminated polyether intermediate having a number average molecular weight of at least 1200 Daltons;

(b) at least one polyisocyanate; and

(c) at least one hydroxyl terminated chain extender;

wherein said polymer formed by reacting (a), (b), and (c) is crosslinked with at least one crosslinking agent made by reacting (i) a hydroxyl terminated polyol selected from the group consisting of polyester, polycaprolactone, polycarbonate and mixtures thereof; and (ii) at least one polyisocyanate.

2. The thermoplastic polyurethane polymer of claim 1 wherein said polyisocyanate in (b) is a diisocyanate.

3. The thermoplastic polyurethane polymer of claim 2 wherein said diisocyanate is diphenyl methane-4,4' diisocyanate.

4. The thermoplastic polyurethane polymer of claim 1 wherein said hydroxyl terminated polyether intermediate has a number average molecular weight of from about 1500 to about 4000 Daltons.

5. The thermoplastic polyurethane polymer of claim 4 wherein said hydroxyl terminated polyether intermediate has a number average molecular weight of from about 1800 to about 2500 Daltons.

6. The thermoplastic polyurethane polymer of claim 5 wherein said hydroxyl terminated polyether intermediate is polytetramethylene ether glycol.

7. The thermoplastic polyurethane polymer of claim 1 wherein said crosslinking agent is a polyester crosslinking agent.

8. The thermoplastic polyurethane polymer of claim 1 wherein said crosslinking agent is the reaction product of a hydroxyl terminated polyester and a diisocyanate.

9. The thermoplastic polyurethane polymer of claim 8, wherein said hydroxyl terminated polyester is the reaction product of a dicarboxylic acid and at least one glycol.

10. The thermoplastic polyurethane polymer of claim 9, wherein said dicarboxylic acid is adipic acid.

11. The thermoplastic polyurethane polymer of claim 10, wherein said glycol is 1,4-butanediol.

12. The thermoplastic polyurethane polymer of claim 10, wherein said glycol is a mixture of at least one branched glycol and at least one straight chain glycol.

13. The thermoplastic polyurethane polymer of claim 12, wherein said branched glycol is neopentyl glycol.

14. The thermoplastic polyurethane polymer of claim 12, wherein said straight chain glycol is selected from the group consisting of 1,4-butanediol and 1,6-hexanediol.

15. The thermoplastic polyurethane polymer of claim 12, wherein said glycol is a 50/50 mole percent mixture of neopentyl glycol and 1,4-butanediol.

16. The thermoplastic polyurethane polymer of claim 1 wherein said polymer has a weight average molecular weight before adding said crosslinking agent of from about 150,000 to about 800,000 Daltons.

17. The thermoplastic polyurethane polymer of claim 16 wherein said weight average molecular weight is from about 200,000 to about 400,000 Daltons.

18. The thermoplastic polyurethane polymer of claim 17 wherein said weight average molecular weight is from about 250,000 to about 350,000 Daltons.

19. The thermoplastic polyurethane polymer of claim 8 wherein said crosslinking agent has a number average molecular weight of from about 1,000 to about 10,000 Daltons.

20. The thermoplastic polyurethane polymer of claim 19 wherein said crosslinking agent has a number average molecular weight of from about 1,500 to about 4,000 Daltons.

21. The thermoplastic polyurethane polymer of claim 20 wherein said crosslinking agent has a number average molecular weight of from about 1,800 to about 2,800 Daltons.

22. The thermoplastic polyurethane polymer of claim 1 wherein said hydroxyl terminated chain extender is 1,4-butanediol.

23. The thermoplastic polyurethane polymer of claim 21 wherein said crosslinking agent is used at a level of from about 5.0 to about 20.0 weight percent of the total weight of said polymer and said crosslinking agent.

24. The thermoplastic polyurethane polymer of claim 23 wherein the level of said crosslinking agent is from about 8.0 to about 17.0 weight percent.

25. The thermoplastic polyurethane polymer of claim 24 wherein the level of said crosslinking agent is from about 10.0 to about 17.0 weight percent.

26. The thermoplastic polyurethane polymer of claim 1 in the form of a fiber.

27. The thermoplastic polyurethane polymer of claim 26, wherein said fiber has a size of from about 20 to about 240 denier.

28. The thermoplastic polyurethane polymer of claim 8 in the form of a fiber, wherein said fiber has a size of from about 20 to about 240 denier.

29. A process for producing melt spun thermoplastic polyurethane fibers comprising:

(a) melting a polyether thermoplastic polyurethane polymer in an extruder, said thermoplastic polyurethane polymer made by reacting (i) at least one hydroxyl terminated polyether intermediate having a number average molecular weight of at least 1200 Daltons, (ii) at least one polyisocyanate, and (iii) at least one hydroxyl terminated chain extender;

(b) adding to said melted thermoplastic polyurethane polymer at least one crosslinking agent made from reacting (i) a hydroxyl terminated polyol selected from the group consisting of polyester, polycaprolactone, polycarbonate, and mixtures thereof, and (ii) at least one polyisocyanate;

(c) feeding said melted thermoplastic polyurethane polymer mixed with said crosslinking agent to at least one spinneret;

(d) passing said melted polymer containing said crosslinking agent through said spinneret to produce melt spun fibers;

(e) cooling said fibers; and

(f) winding said fibers onto bobbins.

30. The process of claim 29 wherein said crosslinking agent is added to said melted polyether thermoplastic polyurethane polymer in said extruder.

31. The process of claim 29 wherein said crosslinking agent is added to said melted polyether thermoplastic polyurethane polymer after said polymer exits said extruder.

32. The process of claim 31 wherein said crosslinking agent and said polymer are mixed with a dynamic mixer.

33. The process of claim 31 wherein said crosslinking agent and said polymer are mixed with a static mixer.

34. The process of claim 29 wherein said crosslinking agent is made from reacting a polyester hydroxyl terminated polyol and diisocyanate.

35. The process of claim 34 wherein said crosslinking agent has a number average molecular weight of from about 1,800 to about 2,800 Daltons.

36. The process of claim 34 wherein said polyester hydroxyl terminated polyol is the reaction product of a dicarboxylic acid and at least one glycol.

37. The process of claim 36 wherein said dicarboxylic acid is adipic acid.

38. The process of claim 37 wherein said glycol is 1,4-butanediol.

39. The process of claim 36 wherein said glycol is a mixture of at least one branched glycol and at least one straight chain glycol.

40. The process of claim 39 wherein said branched glycol is neopentyl glycol.

41. The process of claim 29 wherein said bobbins are wound at a speed of from about 100 to about 3000 meters per minutes.

42. The process of claim 41 wherein said bobbins are wound at a speed of from about 300 to about 1200 meters per minute.

43. The process of claim 29 wherein said fibers have a size of 240 denier or less.

44. The process of claim 43 wherein said fibers have a size of from 20 to 240 denier.

45. The process of claim 29 wherein said crosslinking agent is used at a level of from about 5.0 to about 20.0 weight percent of the total weight of said polyether thermoplastic polyurethane polymer and said crosslinking agent.